

Revealing the radial modes in vortex beams

Sephton B
Dudley A
Forbes A

ABSTRACT:

Light beams that carry orbital angular momentum are often approximated by modulating an initial beam, usually Gaussian, with an azimuthal phase variation to create a vortex beam. Such vortex beams are well defined azimuthally, but the radial profile is neglected in this generation approach. Here, we show that a consequence of this is that vortex beams carry very little energy in the desired zeroth radial order, as little as only a few percent of the incident power. We demonstrate this experimentally and illustrate how to overcome the problem by complex amplitude modulation of the incident field.